ENVIRONMENTAL ASSESSMENT

Project Name: Montana Raceway Subdivision

Submitted To:

Prepared For: Thornton Motorsports LLC

Prepared By:

Date: November 2016

Job # 150601

Table of Contents

Executive Summary

Montana Raceway Subdivision is a proposed major subdivision that will create 57 detached single family home lots. The proposed subdivision has been planned in a manner to be aware of the environment and the surrounding property uses. Effects of the subdivision have been minimized with the proposed layout, power supply and conditions, covenants and restrictions.

This proposed development will have minimal to no effect on agriculture or agricultural water use facilities. The land has been historically used as native grass pasture and a racetrack and there are no irrigation ditches on the property. The proposed subdivision will utilize existing local services as available and will need to develop additional local services as needed to meet the minimum service demands of potential buyers. Generally, the subdivision will use existing services for physical access, emergency response and solid waste disposal. The subdivision will be required to develop other local services such as dry utilities and enhanced fire protection in the area. Public water and wastewater systems will be permitted to serve each lot.

The proposed subdivision is intended to be a relatively natural subdivision limiting the natural environment disturbance. A portion of the development of the subdivision requires the construction of roads, dry utilities, water collection and distribution, wastewater collection and disposal and stormwater management facilities. Removal of vegetation will be required for these construction activities. Areas that are disturbed during construction will be re-vegetated and non-native vegetation will be controlled as a part of the weed management plan. Protective covenants, conditions and restriction will provide land owners with guidance in developing their property in a manner that reduces interruption to the natural landscape wildlife, and environment.

Public safety and human health are protected with the development of public water and wastewater systems that must be constructed and tested as specified by the Montana Department of Environmental Quality. Subdivision plans will be reviewed by the West Valley Fire District Chief to ensure adequate fire protection. There are adequate emergency services available nearby in Kalispell.

The proposed subdivision layout and utility/transportation designs minimize effects upon surrounding and adjacent properties. Roadway construction will be planned and conducted in a manner to minimizing the need for grading, as road grades will match site slopes as possible. An electrical power supply network will be developed for individual on site, or per lot requirements. Montana Raceway Subdivision is planned in a way to minimize effects upon adjacent environments and land uses.

1 Introduction

The proposed Montana Raceway Subdivision is a 57 lot major subdivision located in Section 12, Township 29 North, Range 22 West, P.M.M., Flathead County, Montana. All lots within the subdivision will be subject to sanitation review, as they are approximately 30,000 sq. ft. in size with the intended land use of one single family home, one attached garage and possibly one unattached garage/shop. Montana Raceway Subdivision is being planned in multiple phases. The total subdivision area is 40.6 +/- acres. All 57 lots will be subject to sanitation review. Each reviewed lot will be connected to a community water and sewer system. The proposed subdivision is planned to be a residential subdivision with full time occupancy.

The proposed land use necessitates the development of an Environmental Assessment pursuant to MCA 76-3-603. A complete environmental assessment for the proposed land use following the guidance of Flathead County Subdivision Regulations, Appendix C, has been completed in the following sections of this report.

Figure 1-Project Location courtesy of Google Earth

2 Environmental Description

A description of the surface and groundwater, geology and soils, vegetation, and wildlife use within the area of the proposed subdivision is presented in the following sections.

2.1 Surface Water

There are no surface water development features within the proposed subdivision area. As shown in **Error! Reference source not found.**, the Stillwater River is approximately ¾ of a mile from the subject property. It will collect drainage from the subject property, but will not be adversely affected by the proposed subdivision. There will be no alterations or construction in the stream channel, and therefore no water quality permits will be applied for.

As shown in Figure 1, there is a Zone A, or approximate, 100-year floodplain located to the northeast of the subject property. McDermott Lane is the current and proposed access road to the subject property. This road runs through this approximate floodplain. If improvements are necessary to McDermott Lane, a wetlands investigation maybe required per the Flathead County Subdivision Regulations (FCSR). Coordination and obtaining permits with the U.S. Army Corps of Engineers, the NRCS and other govermental agencies may be necessary.

2.2 Groundwater

According to the Montana Bureau of Mines and Geology (MBMG) Groundwater Assessment Atlas 2, the subject property lies on top of the Deep Aquifer of the Kalispell Valley. Being classified as a confined aquifer by the MBMG, that report states that "the deep aquifer is the most dependable potable-water aquifer in the Kalispell Valley." They also stated that groundwater flows from the surrounding mountain ranges towards the Flathead River and then generally heads south towards Flathead Lake and that "the intermediate and deep alluvial aquifers are highly productive. The median reported well yield is about 25 gpm, but there are more high-yield wells in the deep alluvial aquifer than in the intermediate aquifers."

In terms of water quality, the report stated that "ground water in the Flathead Lake area is of high quality and is generally suitable for domestic consumption, crop irrigation, and most other uses. Overall, the ground water is characterized by dissolved constituents of less than 500 mg/L; the median is 349 mg/L. The major ions in solution are calcium, magnesium, and bicarbonate. Nitrate did not exceed the U.S. EPA's 10 mg/L maximum contaminant level for public drinking water supplies in any of the samples collected for this study (1993–97)."

There is one existing well on the subject property. It is registered with Montana's Ground-Water Information Center (GWIC) under the identification numbers 125944. It shows a static water level of 160 ft., with a total well depth of 300 ft. The Montana Ground-Water Assessment Atlas No. 2, Part B, Map 8 from the MBMG shows a confining layer thickness at the project site to about 200 ft. below the ground surface. The U.S. Geological Survey (USGS) Rose Crossing Quadrangle shows an elevation of roughly 3,100 ft. at the project site. Therefore, we estimate the average groundwater depth to be about 200 ft.

2.3 Geology/Soils

Our initial site visit determined that there are no potential geologic hazards that could affect the proposed subdivision. The slope of the project site ranges from 2% to 30%, with the majority of the lots having a 2% slope.

To our knowledge, there are no unusual soils, topographic or geologic conditions on the property that may limit the capability for construction or excavation using ordinary and reasonable techniques. There are no anticipated soil constraints.

The subject property contains an existing motorsports racetrack that will be removed. It is expected that significant cutting and fillings will be done to blend the topographic depression with the surrounding ground outside of the racetrack. A Stormwater Pollution Prevention Plan will be developed and submitted to the Department of Environmental Quality (DEQ) prior to construction and BMP's installed to prevent erosion.

The Natural Resources Conservation Service (NRCS) soil data containing the physical properties and engineering indices for each soil type, the soil limitations for sanitary facilities, building site development, and water features for each soil type is included in Appendix A.

2.4 Vegetation

The vegetation on the proposed development is primarily a mix of native grasses. The property has historically been used for native grass pasture and more recently a motorsports racetrack with spectator parking. The NRCS identifies this area as rangeland (Ecological Site ID: NRCS Rangeland Site).

There were no critical plant communities identified on the subject property and there are very few trees within the proposed development. The majority of trees on the property are located along the road at the entrance to the property. These trees will be preserved to the greatest extent possible as the proposed subdivision access will closely resemble the existing entrance road.

As the property develops, areas will be disturbed to allow for construction of roadways, drainage features and homes. Following construction, areas that have been disturbed will be replanted with native vegetation or will be landscaped. A weed management plan will be submitted to Flathead County prior to final plat approval.

2.5 Wildlife and Wildlife Habitat

This subdivision is proposed to be built in proximity to possible deer habit. It is also possible that wild turkeys may pass through the area. There is no surface water within or near the boundaries of the subject property.

There are no known critical wildlife areas or rare and endangered species on-site.

There are 2 species of concern listed in the vicinity Section 12, T29N, R22W by the Montana Natural Heritage Program. The following species were listed in this search: Black Tern and Bull Trout. The

proposed subdivision does not have acceptable habitat for the listed species. Species of Concern information is also provided in Appendix B.

This property has no areas that are identified on National Wetlands Inventory Data maps.

2.6 Agriculture and Timber Production

The subject property is not an agricultural or timber tract, however adjacent property to the south and west is agricultural. Impacts to the surrounding agricultural properties will be mitigated by entering into a weed management agreement with Flathead County, paving the roadways, and by having adequate building setbacks.

2.7 Agricultural Water User Facilities

The proposed subdivision has no agricultural user facilities but does adjoin property with agricultural water user facilities. Irrigation water shall be provided by the community water system. There are no irrigation ditches within the property, therefore no users of irrigation water surrounding the subdivision will be impacted. Water rights exist for the well located on the property.

2.8 Historical Features

The property has been used for commercial purposes since 1991. Prior to that it was used for agricultural/rangeland purposes.

There are no known historical, archaeological, or cultural features associated with the land. The Montana Historical Society was contacted for comments and recommendations with regards to historical features. Their records indicated that there have been no previously recorded sites within the subject property. Because of the lack of previous inventory, they recommended that a cultural resource inventory be conducted. Their letter is provided in Appendix C.

Should any historical archaeological or cultural features be discovered during construction, work in that area will be suspended temporarily allowing preservation of such features.

2.9 Visual Impact

The developer has several plans to visually blend the development activities with the natural surroundings. Internal roads are being located to preserve existing trees throughout the property, while earthwork is being minimized to maintain the natural setting of the property. Additionally, the removal of stadium lights will create less of a visual impact.

At a minimum, all disturbed areas will be revegetated to pre-construction densities.

2.10 Air Quality

State and local standards will be adhered to during the construction of the subdivision infrastructure. Dust mitigation measures will be followed during construction.

2.11 Area Hazards

There are no hazardous concerns associated with the property. The proposed subdivision is not in a high fire hazard area, does not have high pressure gas lines or high voltage lines, is not on or adjacent to a superfund or hazardous waste site and is not on or adjacent to abandoned landfills, gravel pits, mines, waste sites or sewage treatment plants.

3 Community Impact

An analysis of anticipated impacts of the proposed subdivision on the community and local services is described in the following sections.

3.1 Water Supply

The developer is planning on drilling two new wells to serve the new subdivision.

This will be for domestic use and irrigation for the individual lots.

Average Daily Demand =	40.2 gpm
Maximum Design Day Demand =	81.7 gpm
Peak Instantaneous Demand =	120.6 gpm

Domestic fire protection will be provided by the West Valley Fire District. The recommendation of the West Valley Fire District IS to have the water system supply fire flow and have fire hydrants installed within the Right of Way.

It is not economically feasible to extend the City of Kalispell's Water Main to the subdivision, as it is approximately 0.5 miles away from the proposed subdivision along the shortest possible path. However, this path would require obtaining easements or extending water service along Highway 93. At this time the developer would like to establish a new community water supply for the subdivision, but is not opposed to connecting to the City's water system if it extends to the subdivision in the future.

There are no anticipated effects on existing water systems or wells in the area. Adequate flow must be determined by pump tests while not affecting the aquifer. The system will be constructed and certified prior to final plat approval for each phase. Construction of the water system will be privately financed by Thornton Motorsports, L.L.C. The water system will be operated by a licensed water system operator.

3.2 Sewage Disposal

Sewage disposal will be provided using a new public subsurface wastewater treatment system. Each lot will have a septic tank and pump to a community drainfield. Per DEQ 2, a typical 2.5 people per household at 100 gallons per capita per day (gpcd) will generate 14,750 gallons of wastewater per day for the entire subdivision.

It is not feasible to connect to the City of Kalispell's wastewater system, as it is approximately 0.5 miles away from the subdivision. The proposed use of a community subsurface wastewater treatment systems will meet the anticipated needs of the subdivision and they will meet the standards of DEQ.

The system will be constructed and certified prior to final plat approval for each phase. Construction of the wastewater system will be privately financed by Thornton Motorsports, L.L.C. The wastewater system will be operated by a licensed wastewater system operator from the beginning of the development through when development is completed and beyond.

3.3 Solid Waste Disposal

Solid waste will be disposed into the Flathead County Solid Waste District Landfill. Evergreen Disposal is available to provide collection, transfer and recycling services for the proposed subdivision. Each home will have a 90-gallon container which will be picked up by Evergreen Disposal weekly. A "Will Serve" letter is included in Appendix E.

3.4 Stormwater

The stormwater collection and drainage system will be comprised of retention ponds and roadside ditches. Preliminary runoff calculations were conducted using the Rational Method. The results are summarized below in Table 1 for the 2, 10 and 100 year storm with a duration of 1 hour.

	2-year (cfs)	10-year (cfs)	100-year (cfs)
Existing Conditions	8.00	15.34	26.84
Proposed Conditions	5.22	10.00	17.50

Table 1 – Prelimary Stormwater Calculations

As shown in the preliminary calculations, the peak runoff will actually decrease with the proposed development. Because the existing racetrack has a large impervious area, the addition of internal roads and houses does not add a significant amount of new impervious area typically found in developments on vacant land. This combined with the addition of more maintained lawns actually decreases the runoff volume generated from the property.

This system will be designed in accordance with DEQ and Flathead County Subdivision Regulations. The HOA will own and operate the stormwater facilities which will be maintained per the stormwater facilities operation and maintenance manual. Preliminary runoff calculations are provided in Appendix D.

3.5 Roads

U.S. Highway 93 is a Montana Department of Transportation (MDT) controlled NHS highway which lies near to the proposed development. The subdivision will access U.S. Highway 93 by using McDermott Lane. As McDermott Lane meets county road standards, no substantial improvements are proposed this time.

All lots will be served by internal public roads within the subdivision, so no lots will have access directly to U.S. 93 or any other arterial roads. All internal roads will be designed and built to Flathead County Road Standards and it is not anticipated that dust control will be necessary because all roads will be

paved. Year round access by conventional automobile will be available over legal right of way to the subdivision and to all lots and common facilities.

As part of the subdivision application process, a Traffic Impact Study (TIS) is required for preliminary plat application acceptance according to Flathead County Subdivision Regulations. The TIS will be submitted along with all other applicable documents. Preliminary findings from the TIS indicate that the existing intersection at McDermott Lane will operate at an acceptable Level of Service (LOS) at full buildout of the development. The subdivision is projected to generate a total of 565 weekday trips and these are all classified as "new trips."

Installation of the internal roads and will be entirely funded by the developer, Thornton Motorsports.

3.6 Utilities

Utilities will be extended to each lot within the proposed Montana Raceway Subdivision. Both telephone and electricity will be placed underground. Preliminary plans will be provided to the below referenced utility companies in Table 2 for review.

Electricity	Flathead Electric Cooperative	2510 US HWY 2 E, Kalispell, MT 59901	(406) 751-4483
Natural Gas	Northwestern Energy	890 N. Meridian Rd., Kalispell, MT 59904	(888) 467-2669
Cable/Telephone/Internet	Charter Spectrum	333 1st Ave E, Kalispell, MT 59901	(888) 438-2427

Table 2 – Dry Utility Providers

3.7 Emergency Services

Emergency services will be provided by West Valley Fire District (WVFD) and Flathead County Sherriff's Office (FCSO). The nearest hospitals are located in Kalispell and Whitefish. Kalispell Regional Medical Center and North Valley Hospital (located 6.6 and 6.7 miles from the subdivision respectively) can provide emergency health services.

In discussions with Russell Sappington, Fire Chief of WVFD, he indicated that the response time would be between 10-20 minutes for first apparatus on scene. They have a mutual aid response from Kalispell Fire Department, Evergreen Fire Department and Whitefish Fire Department in the event of a structure fire. West Valley Fire District has 2 structure engines, 1 61 ft. ladder truck, and 3 water tenders in addition to the additional apparatus and personnel from their mutual aid partners. WVFD does provide Basic Life Support (BLS) ambulance response at this time and in the near future hope to add paramedics to the department. In the meantime, Kalispell Fire Department is their first Advanced Life Support (ALS) unit to respond to the project area.

Emergency responses will access the proposed subdivision by using U.S. Highway 93. All internal streets will be built to Flathead County Standards. There will be two means of vehicular access during all phases of construction to ensure emergency vehicles have access to the subdivision. All plans for fire suppression will be reviewed by the Fire Chief.

In discussions with Brian Heino, Patrol Commander of FCSO, he indicated that the sheriff's office currently runs a full staffing of 6 persons per shift. The project area is considered in the "Local Zone" so they have one deputy assigned, with a rover available to back up calls when needed during high risk calls. He also indicated that response time will vary depending on the call type. A high risk call can be responded to in approximately 5 minutes or less. A low risk call can be a few hours at current call volumes.

With the increase of any residence or business they see an increase in call volumes. However, since the plan is residential, Mr. Heino doesn't see a significant impact unless the structures are duplexes, low income housing, manufactured homes, etc. Because this project will consist of detached single family homes, no significant impacts are anticipated.

3.8 Schools

The proposed development is located within the Whitefish School District. The current educational facilities that would service Montana Raceway Subdivision are Muldown Elementary School, Whitefish Middle School and Whitefish High School. Using the national average for single family homes of 0.6 students per household for single family detached housing, we estimate that 35 students will be generated from the proposed subdivision.

The subdivision can be served by existing bus routes. The Whitefish School District Route No. 3 – KM Route circles the subdivision by way of going south on KM Ranch Road, east on Church Drive, and then north on Hwy. 93.

Attempts to discuss impacts to educational services with the Whitefish School District were not responded to at this time. The district has approximately 1,500 students currently enrolled. A 2.5% increase in enrollment could be expected with this development. This increased enrollment should be accommodated by the present personnel and facilities and there should be no adverse impacts on the provision of educational services.

3.9 Parks and Recreation

The required parkland dedication will be satisfied by a combination of on-site parkland and cash-in-lieu.

Other recreation opportunities exist in this area, such and hiking, horseback riding, biking, skiing and watersports. There is a nearby public golf courses, Northern Pines Golf Course, as well as several others throughout the Flathead Valley.

3.10 Land Use

Currently, this property is located outside of the City of Kalispell and within Flathead County zoning jurisdiction. The parcel is currently zoned as Agricultural-40 (AG-40) and will go through the zone change process to allow for residential development. The parcel is also a part of the Riverdale Neighborhood Plan. Being roughly 0.5 miles from city limits, annexation to the City of Kalispell is not being proposed.

The nearest public lands are located roughly 1.6 miles away from the proposed subdivision. One is located to the northwest of the subject property in section 35, T30N, R22W, while the other is located to

the northeast in Section 32, T30N, R21W. Access to either of those public lands through the subject property is not currently used, and therefore will not be affected by development.

There are no high voltage power lines, high pressure gas lines, dilapidated structures, proposed or existing mining developments or irrigation ditches within the immediate area of the proposed subdivision. All uses within the proposed subdivision are to be Single-Family Home Lots. All uses will conform to the proposed restrictive conditions and covenants.

This development will have minimal effect on the adjacent land uses. Residential subdivisions already exist to the south of the property, while the majority of the adjacent land is agricultural. There will be no known off-site or planned onsite activities that create or will create a nuisance, such as unpleasant odors, unusual noises, dust or smoke. In fact, the possibility of unusual noise will greatly decrease with the removal of the existing racetrack.

3.11 Housing

It is anticipated that one (1) single family residence averaging 3 bedrooms will be built on each of the 57 lots. No other uses are planned within the subdivision.

3.12 Public Health and Safety

We do not anticipate impacts that would negatively affect public health and safety resulting from this subdivision. The subdivision is located in an area that can be effectively served by emergency responders and is not located in an area that is prone to natural or man-made hazards. Roads will be built to Flathead County standards and water will be available within the subdivision for firefighting.

References

"Montana's Ground Water Information Center 2015." Montana's Ground Water Information Center 2015. N.p., n.d. Web. 21 Oct. 2015.

"Web Soil Survey - Home." *Web Soil Survey - Home*. N.p., n.d. Web. 21 Oct. 2015.

United States Department of Agriculture, Natural Resources Conservation Service. *Custom Soil Resource Report for Flathead County, Montana*. Rep. N.p.: n.p., n.d. Print.

United States of America. Montana Department of Environmental Quality. *Circular DEQ 4, Montana Standards for Subsurface Wastewater Treatment Systems*. 2013 ed. N.p.: n.p., n.d. Print.

Gupta, Ram S. *Hydrology and Hydraulic Systems*. Prospect Heights, IL: Waveland, 2001. Print.

Dewberry, ed. *Land Development Handbook*. 3rd ed. New York: McGraw-Hill, 2002. Print.

Montana Bureau of Mines and Geology. *Ground-Water Resources of the Flathead Lake Area: Flathead, Lake, Missoula, and Sanders Counties, Montana*. By John I. LaFave, Larry N. Smith and Thomas W. Patton. N.p.: n.p., n.d. Print. Montana Ground-Water Assessment Atlas 2.

Montana Historical Society. State Historic Preservation Office. *Montana Raceway Subdivision Cultural Resource File Search*. By Damon Murdo. N.p.: n.p., n.d. Print.

APPENDIX A

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Upper Flathead Valley Area, Montana

Montana Raceway Subdivision

August 5, 2016

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Upper Flathead Valley Area, Montana
Survey Area Data: Version 12, Sep 3, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 11, 2011—Jul 30, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Upper Flathead Valley Area, Montana (MT617)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ke	Kalispell loam, 0 to 3 percent slopes	0.4	0.8%
Kza	Kalispell-Tuffit silt loams, 0 to 3 percent slopes	0.5	1.3%
Pc	Prospect loam, 7 to 12 percent slopes	30.3	70.9%
Pd	Prospect loam, 12 to 20 percent slopes	11.5	26.9%
Totals for Area of Interest		**42.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic

classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Upper Flathead Valley Area, Montana

Ke—Kalispell loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 4vqh
Elevation: 2,600 to 3,400 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 105 to 125 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Kalispell and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kalispell

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap - 0 to 8 inches: loam
Bw - 8 to 13 inches: silt loam
Bk - 13 to 30 inches: silt loam
C - 30 to 60 inches: stratified loamy fine sand to silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Very slightly saline (2.0 to 3.0 mmhos/cm)
Available water storage in profile: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Silty (Si) 15-19" p.z. (R044XW184MT)

Minor Components

Nonhydric

Percent of map unit: 10 percent

Kza—Kalispell-Tuffit silt loams, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 4vr0
Elevation: 2,600 to 3,400 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 105 to 125 days
Farmland classification: Not prime farmland

Map Unit Composition

Kalispell and similar soils: 60 percent
Tuffit and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kalispell

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
Bw - 8 to 13 inches: silt loam
C - 13 to 60 inches: stratified loamy fine sand to silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Very slightly saline (2.0 to 3.0 mmhos/cm)
Available water storage in profile: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Silty (Si) 15-19" p.z. (R044XW184MT)

Description of Tuffit

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 4 inches: silt loam
Btn - 4 to 12 inches: silty clay
Bkn - 12 to 29 inches: silty clay loam
C - 29 to 60 inches: stratified very fine sandy loam to silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Moderately saline to strongly saline (8.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 30.0
Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: Claypan (Cp) 15-19" p.z. (R044XW147MT)

Minor Components

Nonhydric

Percent of map unit: 10 percent

Pc—Prospect loam, 7 to 12 percent slopes

Map Unit Setting

National map unit symbol: 4vry
Elevation: 2,600 to 3,400 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 105 to 125 days
Farmland classification: Not prime farmland

Map Unit Composition

Prospect and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Prospect

Setting

Landform: Moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glacial till

Typical profile

A - 0 to 4 inches: loam
Bw - 4 to 12 inches: gravelly silt loam
Bk - 12 to 24 inches: gravelly silt loam
C - 24 to 60 inches: gravelly loam

Properties and qualities

Slope: 7 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Silty (Si) 15-19" p.z. (R044XW184MT)

Minor Components

Nonhydric

Percent of map unit: 15 percent

Pd—Prospect loam, 12 to 20 percent slopes

Map Unit Setting

National map unit symbol: 4vrz
Elevation: 2,600 to 3,400 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 105 to 125 days
Farmland classification: Not prime farmland

Map Unit Composition

Prospect and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Prospect

Setting

Landform: Moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glacial till

Typical profile

A - 0 to 6 inches: loam
Bw - 6 to 14 inches: gravelly silt loam
Bk - 14 to 24 inches: gravelly silt loam
C - 24 to 60 inches: gravelly loam

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: Silty (Si) 15-19" p.z. (R044XW184MT)

Minor Components

Nonhydric

Percent of map unit: 20 percent

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Building Site Development

This folder contains a collection of tabular reports that present soil interpretations related to building site development. The reports (tables) include all selected map units and components for each map unit, limiting features and interpretive ratings. Building site development interpretations are designed to be used as tools for evaluating soil suitability and identifying soil limitations for various construction purposes. As part of the interpretation process, the rating applies to each soil in its described condition and does not consider present land use. Example interpretations can include corrosion of concrete and steel, shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping.

Dwellings and Small Commercial Buildings

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. This table shows the degree and kind of soil limitations that affect dwellings and small commercial buildings.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome

without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Dwellings and Small Commercial Buildings

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range

from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Dwellings and Small Commercial Buildings–Upper Flathead Valley Area, Montana							
Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ke—Kalispell loam, 0 to 3 percent slopes							
Kalispell	90	Not limited		Not limited		Not limited	
Kza—Kalispell-Tuffit silt loams, 0 to 3 percent slopes							
Kalispell	60	Not limited		Not limited		Not limited	
Tuffit	30	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.62	Shrink-swell	0.58	Shrink-swell	0.62
Pc—Prospect loam, 7 to 12 percent slopes							
Prospect	85	Somewhat limited		Somewhat limited		Very limited	
		Slope	0.16	Slope	0.16	Slope	1.00
Pd—Prospect loam, 12 to 20 percent slopes							
Prospect	80	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00

Sanitary Facilities

This folder contains a collection of tabular reports that present soil interpretations related to sanitary facilities. The reports (tables) include all selected map units and components for each map unit, limiting features and interpretive ratings. Sanitary facilities interpretations are tools designed to guide the user in site selection for the safe disposal of sewage and solid waste. Example interpretations include septic tank absorption fields, sewage lagoons, and sanitary landfills.

Sewage Disposal

This table shows the degree and kind of soil limitations that affect septic tank absorption fields and sewage lagoons. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot

be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches or between a depth of 24 inches and a restrictive layer is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, saturated hydraulic conductivity (Ksat), depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Saturated hydraulic conductivity (Ksat) is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a Ksat rate of more than 14 micrometers per second are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Sewage Disposal

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Sewage Disposal–Upper Flathead Valley Area, Montana					
Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Ke—Kalispell loam, 0 to 3 percent slopes					
Kalispell	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
Kza—Kalispell-Tuffit silt loams, 0 to 3 percent slopes					
Kalispell	60	Somewhat limited		Somewhat limited	
		Slow water movement	0.50	Seepage	0.50
Tuffit	30	Very limited		Not limited	
		Slow water movement	1.00		
Pc—Prospect loam, 7 to 12 percent slopes					
Prospect	85	Somewhat limited		Very limited	
		Slow water movement	0.50	Slope	1.00
		Slope	0.16	Seepage	0.50
Pd—Prospect loam, 12 to 20 percent slopes					
Prospect	80	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Slow water movement	0.50	Seepage	0.50

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit.

Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that

is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba).

Engineering Properties–Upper Flathead Valley Area, Montana														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
Ke—Kalispell loam, 0 to 3 percent slopes														
Kalispell	90	B	0-8	Loam	ML	A-4	0- 0- 0	0- 0- 0	100-100 -100	85-93-100	70-75-80	55-65-75	15-20 -25	NP-3 -5
			8-13	Silt loam, loam	ML	A-4	0- 0- 0	0- 0- 0	100-100 -100	85-93-100	70-75-80	55-65-75	15-20 -25	NP-3 -5
			13-30	Silt loam, loam	ML	A-4	0- 0- 0	0- 0- 0	100-100 -100	85-93-100	70-75-80	55-65-75	15-20 -25	NP-3 -5
			30-60	Stratified loamy fine sand to silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100 -100	85-93-100	70-75-80	55-65-75	15-20 -25	NP-3 -5

Engineering Properties–Upper Flathead Valley Area, Montana														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
Kza—Kalispell-Tuffit silt loams, 0 to 3 percent slopes														
Kalispell	60	B	0-8	Silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100 -100	85-93-100	70-75-80	55-65-75	15-20 -25	NP-3 -5
			8-13	Silt loam, loam	ML	A-4	0- 0- 0	0- 0- 0	100-100 -100	85-93-100	70-75-80	55-65-75	15-20 -25	NP-3 -5
			13-60	Stratified loamy fine sand to silt loam	ML	A-4	0- 0- 0	0- 0- 0	100-100 -100	85-93-100	70-75-80	55-65-75	15-20 -25	NP-3 -5
Tuffit	30	C	0-4	Silt loam	CL-ML	A-4	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	85-90-95	20-25 -30	5-8 -10
			4-12	Silty clay, silty clay loam	CL	A-7	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	85-90-95	40-45 -50	15-20-25
			12-29	Silty clay loam, silt loam	CL	A-6	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	85-90-95	30-35 -40	10-13-15
			29-60	Stratified very fine sandy loam to silty clay loam	CL, CL-ML	A-4, A-6	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	95-98-100	85-90-95	20-30 -40	5-10-15
Pc—Prospect loam, 7 to 12 percent slopes														
Prospect	85	B	0-4	Loam	CL-ML	A-4	0- 0- 0	0- 5- 10	90-95-100	85-93-100	75-85-95	55-58-60	20-25 -30	5-8 -10
			4-12	Gravelly silt loam, gravelly loam	CL-ML, GC-GM	A-4	0- 0- 0	0- 8- 15	65-73-80	60-68-75	50-60-70	40-53-65	20-25 -30	5-8 -10
			12-24	Gravelly silt loam, gravelly loam	CL-ML, GC-GM	A-4	0- 0- 0	0- 8- 15	65-73-80	60-68-75	50-60-70	40-53-65	20-25 -30	5-8 -10
			24-60	Gravelly loam, gravelly silt loam	CL-ML, GC-GM	A-4	0- 0- 0	0- 8- 15	65-73-80	60-68-75	50-60-70	40-50-60	20-25 -30	5-8 -10

Engineering Properties–Upper Flathead Valley Area, Montana														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
Pd—Prospect loam, 12 to 20 percent slopes														
Prospect	80	B	0-6	Loam	CL-ML	A-4	0- 0- 0	0- 5- 10	90-95-100	85-93-100	75-85-95	55-58-60	20-25 -30	5-8 -10
			6-14	Gravelly silt loam, gravelly loam	CL-ML, GC-GM	A-4	0- 0- 0	0- 8- 15	65-73-80	60-68-75	50-60-70	40-53-65	20-25 -30	5-8 -10
			14-24	Gravelly silt loam, gravelly loam	CL-ML, GC-GM	A-4	0- 0- 0	0- 8- 15	65-73-80	60-68-75	50-60-70	40-53-65	20-25 -30	5-8 -10
			24-60	Gravelly loam, gravelly silt loam	CL-ML, GC-GM	A-4	0- 0- 0	0- 8- 15	65-73-80	60-68-75	50-60-70	40-50-60	20-25 -30	5-8 -10

Water Features

This folder contains tabular reports that present soil hydrology information. The reports (tables) include all selected map units and components for each map unit. Water Features include ponding frequency, flooding frequency, and depth to water table.

Hydrologic Soil Group and Surface Runoff

This table gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. The concept indicates relative runoff for very specific conditions. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

Report—Hydrologic Soil Group and Surface Runoff

Absence of an entry indicates that the data were not estimated. The dash indicates no documented presence.

Hydrologic Soil Group and Surface Runoff–Upper Flathead Valley Area, Montana			
Map symbol and soil name	Pct. of map unit	Surface Runoff	Hydrologic Soil Group
Ke—Kalispell loam, 0 to 3 percent slopes			
Kalispell	90	—	B
Kza—Kalispell-Tuffit silt loams, 0 to 3 percent slopes			
Kalispell	60	—	B
Tuffit	30	—	C
Pc—Prospect loam, 7 to 12 percent slopes			
Prospect	85	—	B
Pd—Prospect loam, 12 to 20 percent slopes			
Prospect	80	—	B

Water Management

This folder contains a collection of tabular reports that present soil interpretations related to water management. The reports (tables) include all selected map units and components for each map unit, limiting features and interpretive ratings. Water management interpretations are tools for evaluating the potential of the soil in the application of various water management practices. Example interpretations include pond reservoir area, embankments, dikes, levees, and excavated ponds.

Ponds and Embankments

This table gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the saturated hydraulic conductivity (Ksat) of the soil and the depth to

fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, Ksat of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Ponds and Embankments

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Ponds and Embankments–Upper Flathead Valley Area, Montana							
Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ke—Kalispell loam, 0 to 3 percent slopes							
Kalispell	90	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Piping	1.00	Depth to water	1.00
				Dusty	0.10		
Kza—Kalispell-Tuffit silt loams, 0 to 3 percent slopes							
Kalispell	60	Somewhat limited		Very limited		Very limited	
		Seepage	0.70	Piping	1.00	Depth to water	1.00
				Dusty	0.07		
Tuffit	30	Somewhat limited		Very limited		Very limited	
		Seepage	0.03	Piping	1.00	Depth to water	1.00
				Salinity	1.00		
				Dusty	0.13		
Pc—Prospect loam, 7 to 12 percent slopes							
Prospect	85	Very limited		Very limited		Very limited	
		Slope	1.00	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Dusty	0.14		
Pd—Prospect loam, 12 to 20 percent slopes							
Prospect	80	Very limited		Very limited		Very limited	
		Slope	1.00	Piping	1.00	Depth to water	1.00
		Seepage	0.70	Dusty	0.13		

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX B

MONTANA
Natural Heritage
Program

P.O. Box 201800 • 1515 East Sixth Avenue • Helena, MT 59620-1800 • fax 406.444.0266 • tel 406.444.5354 • http://mtnhp.org

August 9, 2016

Tobias Liechti
tobias@apec-mt.com

Dear Tobias,

I am writing in response to your recent request regarding Montana Species of Concern in the vicinity of the Montana Raceway Subdivision, in Section 12, T29N, R22W. I checked our databases for information in this general area and have enclosed 2 species occurrence reports for 2 animal species of concern, a map depicting species of concern and wetland locations, and explanatory material, including agency contacts that may have additional information about the area. Note that the maps are in Adobe GeoPDF format. With the appropriate Adobe Reader, it provides a convenient way to query and understand the information presented on the map. Documentation is included.

Please keep in mind the following when using and interpreting the enclosed information and maps:

(1) These materials are the result of a search of our database for species of concern that occur in an area defined by the requested township, range and section(s) with an additional one-mile buffer surrounding the requested area. This is done to provide a more inclusive set of records and to capture records that may be immediately adjacent to the requested area. Please let us know if a buffer greater than 1 mile would be of use to your efforts. Reports are provided for the species of concern that are located in your requested area with a one-mile buffer. Species of concern outside of this buffered area may be depicted on the map due to the map extent, but are not selected for the SOC report.

(2) On the map, polygons represent one or more source features as well as the locational uncertainty associated with the source features. A source feature is a point, line, or polygon that is the basic mapping unit of a Species Occurrence (SO) representation. The recorded location of the occurrence may vary from its true location due to many factors, including the level of expertise of the data collector, differences in survey techniques and equipment used, and the amount and type of information obtained. Therefore, this inaccuracy is characterized as locational uncertainty, and is now incorporated in the representation of an SO. If you have a question concerning a specific SO, please do not hesitate to contact us.

(3) This report may include sensitive data, and is not intended for general distribution, publication, or for use outside of your organization. In particular, public release of specific location information may jeopardize the welfare of threatened, endangered, or sensitive species or biological communities.

(4) The accompanying map(s) display land management status, which may differ from ownership. Features shown on this map do not imply public access to any lands.

(5) Additional biological data for the search area(s) may be available from other sources. We suggest you contact the U.S. Fish and Wildlife Service for any additional information on threatened and endangered species (406-449-5225). For additional fisheries information in your area of interest, you may wish to contact Montana Fish, Wildlife, and Park's Montana Fisheries Information System (phone: 406-444-3373, or web site: **http://fwp.mt.gov/fishing/mFish/**).

(6) Additional information on species habitat, ecology and management is available on our web site in the Plant, Animal, and ecological Systems Field Guides, which we encourage you to consult for valuable information. You can access these guides at http://mtnhp.org. General information on any species can be found by accessing the link to NatureServe Explorer.

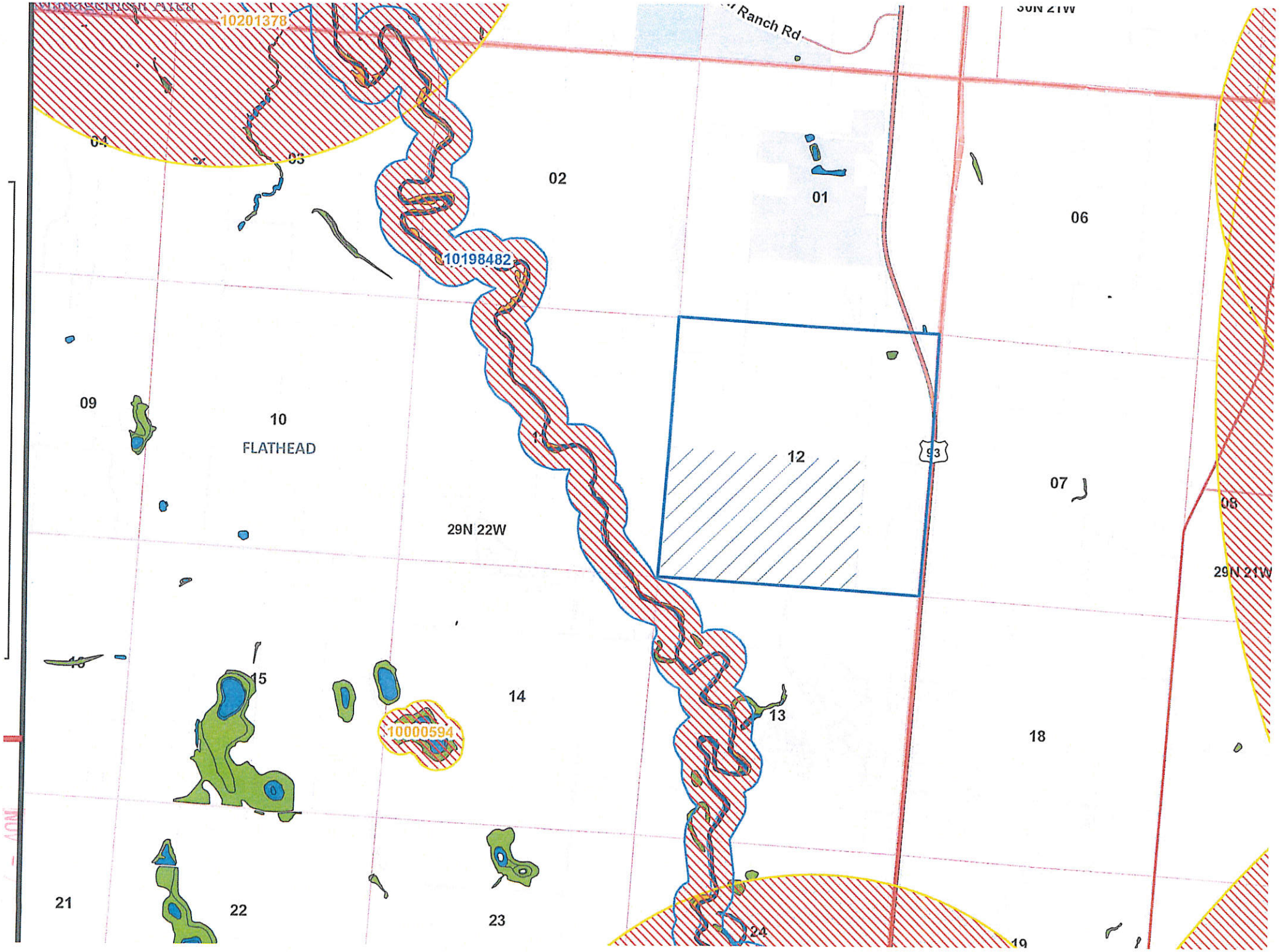
The results of a data search by the Montana Natural Heritage Program reflect the current status of our data collection efforts. These results are not intended as a final statement on sensitive species within a given area, or as a substitute for on-site surveys, which may be required for environmental assessments. The information is intended for project screening only with respect to species of concern, and not as a determination of environmental impacts, which should be gained in consultation with appropriate agencies and authorities.

In order to help us improve our services to you, we invite you to take a simple survey. The survey is intended to gather some basic information on the value and quality of the information and services you recently received from the Montana Natural Heritage Program. The survey is short and should not take more than a few minutes to complete. All information will be kept confidential and will be used internally to improve the delivery of services and to help document the value of our services. Use this link to go to the survey: **http://www.surveymonkey.com/s/RYN8Y8L**.

I hope the enclosed information is helpful to you. Please feel free to contact me at (406) 444-3290 or via my e-mail address, below, should you have any questions or require additional information.

Sincerely,

Martin P. Miller
Montana Natural Heritage Program
martinm@mt.gov


10201378
10198482
10000594
Ranch Rd
30N 21W
04
03
02
01
06
09
10
FLATHEAD
11
12
93
07
08
29N 22W
29N 21W
15
14
13
18
21
22
23
24
19

MONTANA Natural Heritage Program
Natural Resource Information System
Montana State Library
PO Box 201800
Helena, MT 59620-1800
(406)444-5354 mtnhp@mt.gov

Species of Concern Data Report

Visit http://mtnhp.org for additional information.

Report Date:
Tuesday, August 9, 2016

Chlidonias niger

View Species in MT Field Guide

Common Name: Black Tern
Description: Birds
General Habitat: Wetlands

Mapping Delineation:
Standing wacter bodies with confirmed nesting areas buffered by 100 meters in order to reflect importance of adjacent terrestrial habitats to breeding success.

Species Status

Click Status for Explanations

Natural Heritage Ranks:
State: S3B
Global: G4

Federal Agency Status:
U.S. Fish & Wildlife Service:
U.S. Forest Service:
U.S. Bureau of Land Management: SENSITIVE

FWP SWAP Status: SGCN3

MT PIF Code: 2

Species Occurrences

Species Occurence Map Label: 10000594

First Observation Date: 07/01/1995
Last Observation Date: 07/01/1995
SO Number:
Acreage: 39

Salvelinus confluentus

View Species in MT Field Guide

Common Name: Bull Trout
Description: Fish
General Habitat: Mountain streams, rivers, lakes

Mapping Delineation:
Stream reaches and standing water bodies where the species is believed to be present based on the professional judgement of a fisheries biologist, potentially supported by habitat assessment, direct capture, or confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters, standing water bodies greater than 1 acre are buffered 50 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards.

Species Status

Click Status for Explanations

Natural Heritage Ranks:
State: S2
Global: G4

Federal Agency Status:
U.S. Fish & Wildlife Service: LT
U.S. Forest Service: THREATENED
U.S. Bureau of Land Management: SPECIAL STATUS

FWP SWAP Status: SGCN2

MT PIF Code:

Species Occurrences

Species Occurence Map Label: 10198482

First Observation Date:
Last Observation Date:
SO Number:
Acreage: 17,050

NOV

APPENDIX C

Tobias Liechti

From: Murdo, Damon <dmurdo@mt.gov>
Sent: Wednesday, August 10, 2016 10:28 AM
To: Tobias Liechti
Subject: RE: File Search Request Form - Montana Raceway Subdivision
Attachments: 2016080902.pdf

Big Sky. Big Land. Big History.
Montana
Historical Society

August 10, 2016

Toby Liechti
APEC Engineering
75 Somers Rd
Somers MT 59932

RE: MONTANA RACEWAY 59 LOT SUBIDIVISION, FLATHEAD CO. SHPO Project #: 2016080902

Dear Mr. Liechti:

I have conducted a cultural resource file search for the above-cited project located in Section 12, T29N R22W. According to our records there have been no previously recorded sites within the designated search locale. The absence of cultural properties in the area does not mean that they do not exist but rather may reflect the absence of any previous cultural resource inventory in the area, as our records indicated none.

It is SHPO's position that any structure over fifty years of age is considered historic and is potentially eligible for listing on the National Register of Historic Places. If any structures are to be altered and are over fifty years old we would recommend that they be recorded and a determination of their eligibility be made.

As long as there will be no disturbance or alteration to structures over fifty years of age we feel that there is a low likelihood cultural properties will be impacted. We, therefore, feel that a recommendation for a cultural resource inventory is unwarranted at this time. However, should structures need to be altered or if cultural materials be inadvertently discovered during this project we would ask that our office be contacted and the site investigated.

If you have any further questions or comments you may contact me at (406) 444-7767 or by e-mail at dmurdo@mt.gov. I have attached an invoice for the file search. Thank you for consulting with us.

Sincerely,

Damon Murdo
Cultural Records Manager
State Historic Preservation Office

File: LOCAL/SUBDIVISIONS/2016

NOV

APPENDIX D

ENTER VALUES IN YELLOW HIGHLIGHTED BLOCKS

PROJECT:	Montana Raceway
PROGECT TYPE:	SUBDIVISION
DRAINAGE:	#1
AREA DESCRIPTION:	RESIDENTIAL
LOCATION:	
COUNTY:	FLATHEAD
STATE:	MT
NUMBER OF LOTS:	59

REQUIRED STORMWATER DETENTION VOLUME: Montana Raceway SUBDIVISION (RESIDENTIAL AREA ONLY), FLATHEAD COUNTY, MT DRAINAGE #1, RESIDENTIAL

RELATIVE IMPERVIOUSNESS FACTORS:		(C Range)	(C Used)
PAVED AREAS/STRUCTURES	=	(0.8-0.9)	0.9
GRAVELED AREAS	=	(0.35-0.8)	0.8
UNIMPROVED RANGELAND	=	(0.15-0.4)	0.3
LANDSCAPED (lawn, shurbs,trees)	=	(0.1-0.3)	0.1

2 YEAR -1HOUR STORM EVENT:	i =	0.48 in\hr
10 YEAR -1 HOUR STORM EVENT:	i =	0.92 in/hr
100 YEAR -1 HOUR STORM EVENT:	i =	1.61 in/hr
2 YEAR -24 HOUR STORM EVENT:	i =	1.09 in/hr
100 YEAR -24 HOUR STORM EVENT:	i =	0.095 in/hr

		NEW SITE LAYOUT			EXISTING SITE LAYOUT		
AREAS:		AREA (Ft2)			AREA (Ft2)		
TOTAL AREA OF WATERSHED	=	1,742,400.00	sq. ft.	40.000 acres			
PAVED AREAS/STRUCTURES	=	369227.00	sq. ft.	8.476 acres	329313.00	sq. ft.	7.56 acres
GRAVELED AREAS	=	0.00	sq. ft.	0.00 acres	0.00	sq. ft.	0.00 acres
UNIMPROVED	=	0.00	sq. ft.	0.00 acres	1,413,086	sq. ft.	32.44 acres
LANDSCAPED	=	1373173.00	sq. ft.	31.52 acres	0.00	sq. ft.	0.00 acres
TOTAL	=	1742400.00	sq. ft.	40.00 acres	1742399.00	sq. ft.	40.00 acres

RETENTION SWALE			
SLOPE	3	to	1
DEPTH	2	ft	
WIDTH	0	ft	
LENGTH OF ROADSIDE	2120	ft	
% OF LENGTH USABLE AS SWALE	75	%	

REQUIRED STORMWATER DETENTION VOLUME: Montana Raceway SUBDIVISION (RESIDENTIAL AREA ONLY), FLATHEAD COUNTY, MT
DRAINAGE #1, RESIDENTIAL 2 YR - 1 HR EVENT

RELATIVE IMPERVIOUSNESS FACTORS:		(C Range)	(C Used)
PAVED AREAS/STRUCTURES	=	(0.8-0.9)	0.9
GRAVELED AREAS	=	(0.35-0.8)	0.8
UNIMPROVED RANGELAND	=	(0.15-0.4)	0.3
LANDSCAPED (lawn, shurbs,trees)	=	(0.1-0.3)	0.1

2 YEAR -1HOUR STORM EVENT: i 0.48 in\hr
T 1 HOUR 3600 sec/hr

		NEW SITE LAYOUT		EXISTING SITE LAYOUT	
AREAS:		AREA (Ft2)		AREA (Ft2)	
TOTAL AREA OF WATERSHED	=	1,742,400.00 sq. ft.	40.000 acres		
PAVED AREAS/STRUCTURES	=	369227.00 sq. ft.	8.476 acres	329313.00 sq. ft.	7.56 acres
GRAVELED AREAS	=	0.00 sq. ft.	0.00 acres	0.00 sq. ft.	0.00 acres
UNIMPROVED	=	0.00 sq. ft.	0.00 acres	1,413,086 sq. ft.	32.44 acres
LANDSCAPED	=	1373173.00 sq. ft.	31.52 acres	0.00 sq. ft.	0.00 acres
TOTAL	=	1742400.00 sq. ft.	40.00 acres	1742399.00 sq. ft.	40.00 acres
VOLUMES REQUIRED:		Volume of runoff = (C*I*A)*T Total Volume Difference = New Volume - Existing Volume			
PAVED AREAS/STRUCTURES	=	13292.17 C.F.	492.30 C.Y.	11855.27 C.F.	439.08 C.Y.
GRAVELED AREAS	=	0.00 C.F.	0.00 C.Y.	0.00 C.F.	0.00 C.Y.
UNIMPROVED	=	0.00 C.F.	0.00 C.Y.	16957.03 C.F.	628.04 C.Y.
LANDSCAPED	=	5492.69 C.F.	203.43 C.Y.	0.00 C.F.	0.00 C.Y.
TOTAL VOLUME	=	18784.86 C.F.	695.74 C.Y.	28812.30 C.F.	1067.12 C.Y.
FLOW IN C.F.S.	=	5.22 C.F.S.		8.00 C.F.S.	
TOTAL VOLUME DIFFERENCE	=	**-10027 C.F.**	**-371 C.Y.**	**-75005.22 GAL**	
TOTAL FLOW IN C.F.S.	=	-2.79 C.F.S.			

REQUIRED STORMWATER DETENTION VOLUME: Montana Raceway SUBDIVISION (RESIDENTIAL AREA ONLY), FLATHEAD COUNTY, MT
DRAINAGE #1, RESIDENTIAL 100 YR - 1 HR EVENT

RELATIVE IMPERVIOUSNESS FACTORS:		(C Range)	(C Used)
PAVED AREAS/STRUCTURES	=	(0.8-0.9)	0.9
GRAVELED AREAS	=	(0.35-0.8)	0.8
UNIMPROVED RANGELAND	=	(0.15-0.4)	0.3
LANDSCAPED (lawn, shurbs,trees)	=	(0.1-0.3)	0.1

100 YEAR -1 HOUR STORM EVENT: i 1.61 in/hr
T 1 HOUR 3600 sec/hr

		NEW SITE LAYOUT		EXISTING SITE LAYOUT	
AREAS:		AREA (Ft2)		AREA (Ft2)	
TOTAL AREA OF WATERSHED	=	1,742,400 sq. ft.	40.000 acres		
PAVED AREAS/STRUCTURES	=	369227.00 sq. ft.	8.476 acres	329313.00 sq. ft.	7.56 acres
GRAVELED AREAS	=	0.00 sq. ft.	0.00 acres	0.00 sq. ft.	0.00 acres
UNIMPROVED	=	0.00 sq. ft.	0.00 acres	1,413,086 sq. ft.	32.44 acres
LANDSCAPED	=	1373173.00 sq. ft.	31.52 acres	0.00 sq. ft.	0.00 acres
TOTAL	=	1742400.00 sq. ft.	40.00 acres	1742399.00 sq. ft.	40.00 acres
VOLUMES REQUIRED:		Volume of runoff = (C*I*A)*T			
		Total Volume Difference = New Volume - Existing Volume			
PAVED AREAS/STRUCTURES	=	44584.16 C.F.	1651.27 C.Y.	39764.54 C.F.	1472.76 C.Y.
GRAVELED AREAS	=	0.00 C.F.	0.00 C.Y.	0.00 C.F.	0.00 C.Y.
UNIMPROVED	=	0.00 C.F.	0.00 C.Y.	56876.71 C.F.	2106.54 C.Y.
LANDSCAPED	=	18423.40 C.F.	682.35 C.Y.	0.00 C.F.	0.00 C.Y.
TOTAL VOLUME	=	63007.56 C.F.	2333.61 C.Y.	96641.26 C.F.	3579.31 C.Y.
FLOW IN C.F.S.	=	17.50 C.F.S.		26.84 C.F.S.	
TOTAL VOLUME DIFFERENCE	=	-33634 C.F.	-1246 C.Y.	-251580.01 GAL	
TOTAL FLOW IN C.F.S.	=	-9.34 C.F.S.			

APPENDIX E

Evergreen Disposal

"Serving Northwest Montana for over 40 Years"

October 31, 2016

Tobias M. Liechti, EI
APEC Engineering Inc.
75 Somers Road
Somers, MT 59932
toblas@apec-mt.com

RE: MONTANA RACEWAY SUBDIVISION LOCATED AT 3790 HWY 93 N., KALISPELL, MT 59901

LEGAL DESCRIPTION: TRACT 4, SECTION 12, T29N, R22W, P.M.M.

This letter is to notify you that Evergreen Disposal is the private waste hauler for the above referenced property. We are capable of providing containers ranging from a household 90 gallon bin up to a 6 yard metal bin with weekly service.

Please let me know if you have any questions.

Sincerely,

Cindy Owens
Office Manager
Evergreen Disposal